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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/064,408	07/10/2002	Prodyot Roy	121118	7456
6147	7590	11/30/2004	EXAMINER	
GENERAL ELECTRIC COMPANY GLOBAL RESEARCH PATENT DOCKET RM. BLDG. K1-4A59 NISKAYUNA, NY 12309			MERCADO, JULIAN A	
			ART UNIT	PAPER NUMBER
			1745	

DATE MAILED: 11/30/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/064,408	Applicant(s) ROY ET AL.	
	Examiner Julian Mercado	Art Unit 1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-35 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-35 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>1-16-04, 7-16-02</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Claim Objections

Claims 23 and 26 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

Claim 23 recites that the fuel gas comprises hydrogen, however, claim 22 (from which claim 23 depends) already recites the same in line 11.

Claim 26 recites that the oxidizing gas is air, however, claim 25 (from which claim 26 depends) recites that the oxidizing gas is oxygen. The examiner asserts that while air comprises oxygen, the reverse is not true, i.e. oxygen is a subset of air.

Claim 26 objected to because of the following informalities: in line 1, "wherein" requires changing to --wherein the--.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-27 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The terms "proximal" and "distal" in claim 1 at lines 5-6 and claim 22 at line 5 are relative terms which render the claim indefinite. The terms are not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

By analogy, the elbow is "proximal" while the wrist is "distal" to the body's centerline. The fuel cell illustrated in Figure 1, while having symmetry in both the horizontal and vertical directions, does not have a clear point of reference for the "proximal" and "distal" terms as claimed.

Claim 24 recites the fuel gas as comprising "at least one of methane and propane" while also depending from claim 23, which recites that the fuel gas comprises hydrogen. Claim 24 is therefore unclear in view of methane or propane gas being mutually exclusive from hydrogen gas.

Claims 2-21 and 23-27 are rejected under 35 U.S.C. 112, second paragraph, as being dependent upon a rejected base claim.

Claim Rejections - 35 USC § 102 and 103

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 28-31 and 35 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Deublein et al. (Hydrogen-Conducting Electrolyte Configurations, Solid State Ionics 28-30 (1988), pp. 1084-1088)

Claims 1, 22, 28 are the independent claims present for consideration. Regarding claim 28, Deublein et al. teaches an electrolyte comprising a molten salt of lithium chloride, potassium chloride and lithium hydride. (Figure 1, pg. 1085 under section 2.1, also applies to claims 12, 13, 14, 29-31) The anode and cathode comprise a hydrogen permeable membrane such as palladium, *inter alia*. (Figure 1, also applies to claims 2, 3, 7)

Regarding claims 28, as to a hydride ion conductance number greater than about 0.95, as molten carbonate electrolyte disclosed by Deublein et al. is identical to that disclosed and claimed by applicant it would naturally flow to inherently have the same hydride ion conductance number, absent of a showing by applicant that the claimed invention distinguishes over the reference. *In re Best*, 195 USPQ at 433, footnote 4 (CCPA 1977) and *In re Spada*, 15 USPQ 2d 1655 (Fed. Cir. 1990)

As to the fuel cell operating temperature, this limitation being drawn to an operational feature has not been given patentable weight as it fails to give structural breadth or scope to the claimed fuel cell. (applies to claims 18-20 and 35)

Claims 1-3, 9-23, 25, 27 and 32-34 rejected under 35 U.S.C. 103(a) as being unpatentable over Deublein et al. in view of Kaun et al. (U.S. Pat. 4,714,661)

The teachings of Deublein et al. are discussed above.

Deublein et al. does not explicitly teach the particulars of the fuel cell system as required by claim 1. However, Kaun et al. teaches a fuel cell assembly, also of the molten carbonate type, having an anode [40] and cathode [42] spaced apart by a spacer element [68]. (col. 5 line 30 to col. 6 line 22, also applies to claim 27) Notwithstanding the 35 U.S.C. 112, second paragraph rejection (discussed above), the spacer is both proximal and distal to the cathode and anode in that it is in contact with spaced sheets [65], [66] defining the anode and cathode elements. (col. 6 line 8-13) Fuel and oxidant gas inlets [24], and respective exhaust ports [26] deliver fuel and oxidant gas to the fuel cell. (col. 3 line 48-61, applies to claims 23, 25) The spacer element is alumina. (col. 6 line 6, applies to claim 21)

Thus, the skilled artisan would find obvious to employ these elements in Deublein's invention in that these components are implicitly part of a fuel cell system.

Regarding claims 9-11, absent of unexpected results the thickness of the anode and cathode is considered an optimizable parameter for a result-effective variable. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980) The thickness of the electrode directly affects the relative area of fuel and oxidant reaction.

With respect to claims 15-17 and 32-34, absent of unexpected results it is asserted that the weight range of the molten salt components is an optimizable parameter for a result-effective variable. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980) The weight ranges directly affect the hydrogen conduction and resulting cell voltage. (Deublein et al., pg. 1085 under section 2)

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Claims 4-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Deublein et al. in view of Kaun et al., and further in view of Hatoh et al. (U.S. Pat. 5,354,627)

The teachings of Deublein et al. and Kaun et al. are discussed above.

With respect to claims 4-7, Hatoh et al. is relied upon to teach an anode of molybdenum and tungsten. (col. 2 line 3-12) The skilled artisan would find obvious to further modify Deublein et al.'s invention by employing a molybdenum/tungsten anode for reasons such as improving the anti-creep characteristic of the fuel cell. (col. 2 lines 13-17)

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Deublein et al. in view of Kaun et al., and further in view of Fellows. (U.S. Pat. 6,071,634)

The teachings of Deublein et al. and Kaun et al. are discussed above.

As to a tubular fuel cell, Fellows is relied upon to show that tubular fuel cells are mutually equivalence to planar fuel cells (col. 3 line 58-60), additionally, a tubular fuel cell would be an obvious substitution to the skilled artisan in recognition of its higher cell body strength and improved cell sealing.

Claims 24 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Deublein et al. in view of Kaun et al., and further in view of Aoyama. (U.S. Pat. 5,616,430)

The teachings of Deublein et al. and Kaun et al. are discussed above.

Aoyama is relied upon to teach mutual equivalence of hydrogen with methane gas and of air with oxygen gas. (col. 2 line 47-50, col. 8 line 23-37) The skilled artisan would find obvious

to employ methane in order to generate hydrogen reformat. Use of air would be obvious in view of its ubiquitous availability.

Information Disclosure Statement

U.S. Pat. 4,833,046 to Roy has been relied upon by the examiner as an equivalent related publication to DE 37 30 209 A1 cited in the January 14, 2004 Information Disclosure Statement (IDS).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Julian Mercado whose telephone number is (571) 272-1289. The examiner can normally be reached on Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan, can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

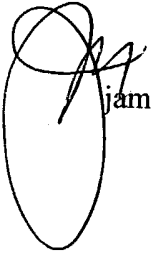
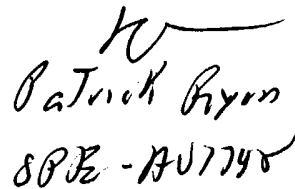
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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

A handwritten signature, possibly reading "jam", enclosed within a large, hand-drawn oval.A handwritten signature, possibly reading "Patrick Ryan", followed by the text "SPE - AU7748".